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EXCELSIOR

Société Anonyme
des
Automobiles "Excelsior"
Saventhem (Belgique)

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des

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Saventhem (Belgique)

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PREFACE

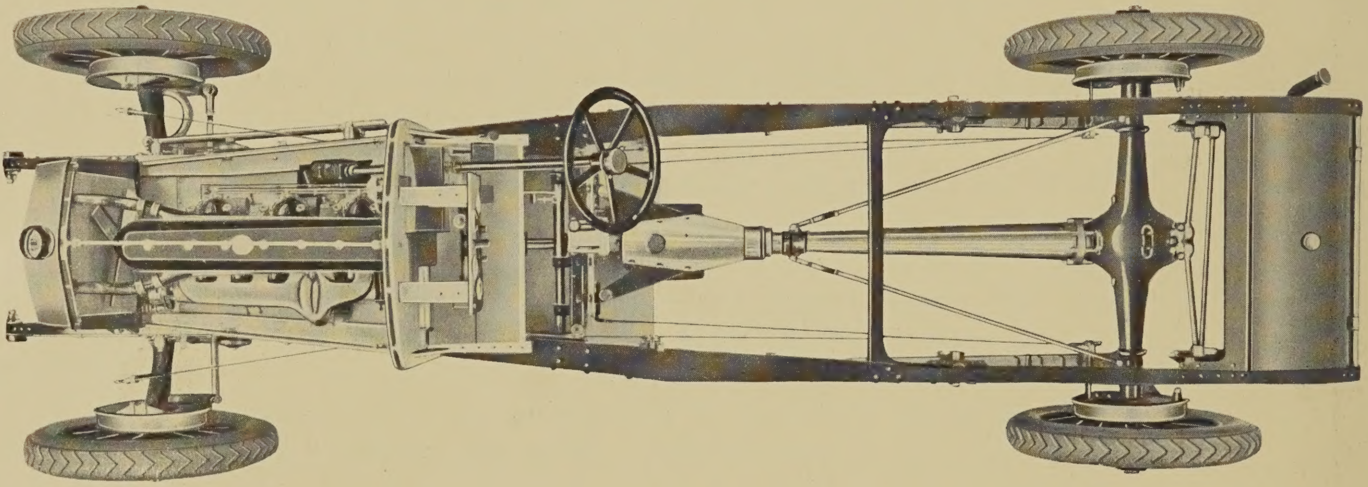
When we designed the new ’Excelsior” chassis it was our intention to produce a car better than any other car built. ❧ We relied upon certain new features in design which to our satisfaction proved to be of utmost importance. ❧ Furthermore we had been able to eliminate certain weak points in old-established designs which gave far reaching aspects of future developments.

We believe that we have succeeded in bringing out a car which on account of its superior design is well ahead of any other motor car of today. ❧ We have safeguarded these merits of superior design by using the finest materials available — indeed without regard to cost and origin. ❧ And the same workmanship which singles out the "Excelsior" motor is found in every small part of the chassis.

The performance of the car is characterized by a combination of speed, acceleration, and smooth running which strikes one as being quite unusual.

We are confident that the care with which the "Excelsior" has been built and the total disregard for initial cost of manufacture are items which will give future returns of satisfactory service over a period of a great many years.

S. A. des Automobiles "Excelsior".



"Excelsior" Chassis, "Adex" licence
Type C. 6 cylinders, 35 H. P.
Plan view

THE " EXCELSIOR " SIX CYLINDER MOTOR

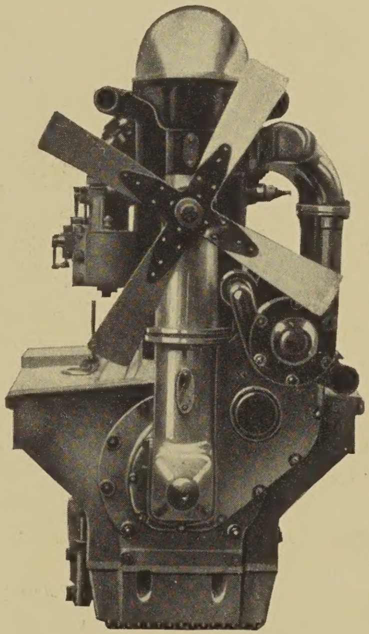
THE motor embodies characteristics of an engine designed especially for the purpose of developing an immense power. However, it possesses to a full extent all the qualities essential to long life and reliability.

The engine is equally impressive on account of its sturdyness and clean design.

The engine has been designed so as to be in complete harmony and proportion with the chassis, a feature which has been realized in only a few other motor car designs, and which is all-important to the comfort and riding qualities of a car.

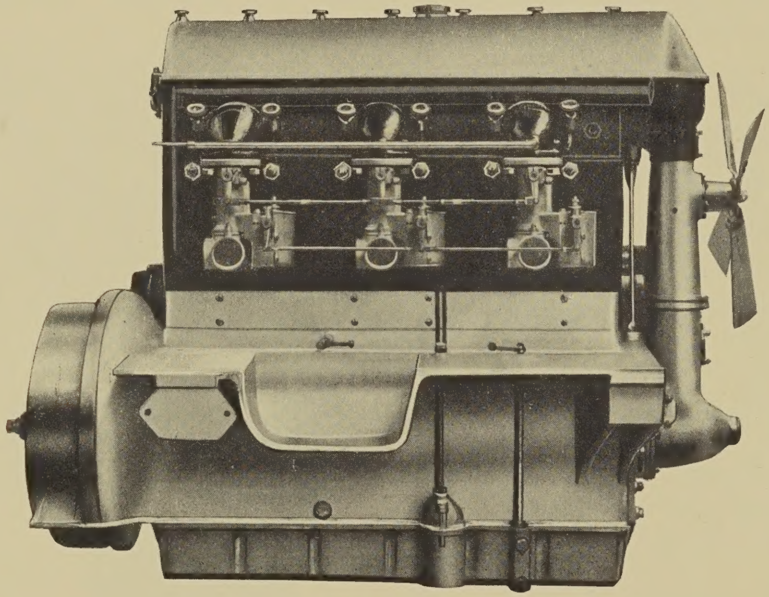
The engine delivers its power with a minimum of gasoline consumption and with the total absence of noise and vibration. It may truly be said that the « Excelsior » engine is the only engine of the overhead camshaft type which is absolutely silent. This is an accomplishment which is so much greater since in this engine all transmission of movement is done by gears, no chains being used.

The six cylinders are cast in bloc, and the cylinder head is detachable. The combustion chamber, of a most original form, permits the use of valves of actually larger diameter than one-half the bore of


« Excelsior » engine. — Sports type.
Front view.

the cylinder. This results in quick refilling of the cylinders and a quick escape of the hot combustion gas, a point which is necessary to efficiency and continuous production of great power at high speed.

In conformity with recent discoveries both cylinder head and piston head have been perfectly planed and no spherical surface have been allowed.

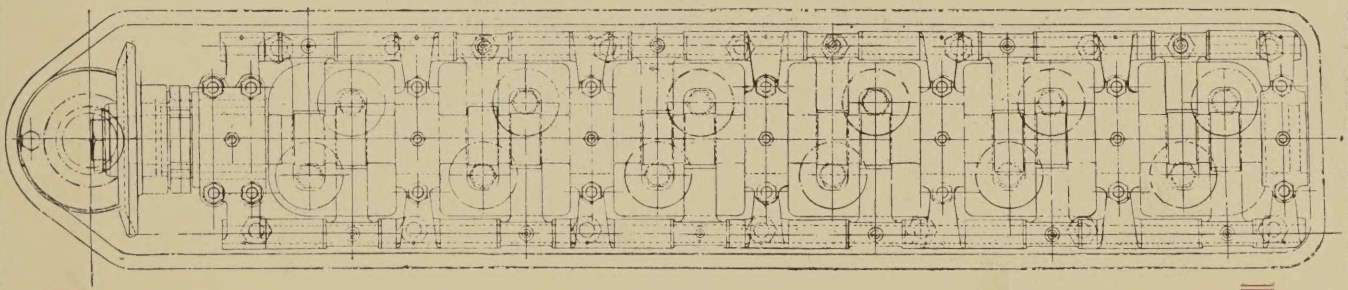

« Excelsior » engine. — Sports type. — Inlet side.

The detonation, which so frequently occurs in over head valve engines of the high compression type, especially when using low grade fuel, is not felt in the « Excelsior » engine. The motor is surprisingly free from carbon troubles, and no fear need be had of letting the engine run at top speed all day long.

The valves, one inlet and one exhaust for each cylinder, are manufactured from a spécial steel which is non-corrosive, and will not warp. The ability of the « Excelsior » engine to hold the compression is a feature which every driver will appreciate.

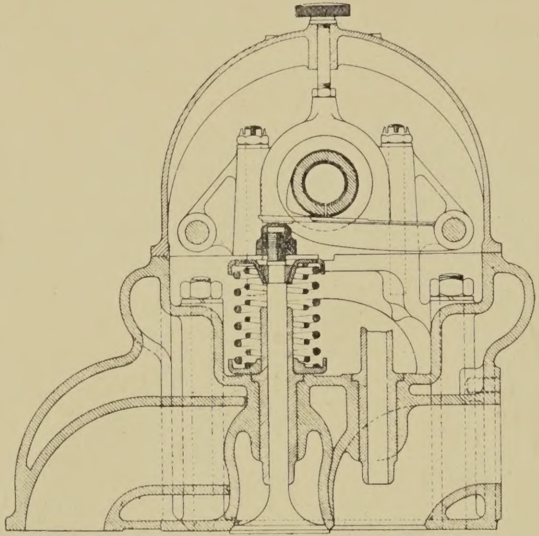
The valves are actuated by a camshaft placed above the cylinder head. The whole valve mechanism is a masterpiece of ingenuity. It causes quick opening of the valves without being noisy. The opening of the exhaust valve is accelerated, so that the gas escapes mainly under its own pressure, and reduces the internal resistance of the motor to a great degree. The cams are of normal profil ; but the arrangement of the rockerarms is most original.

The camshaft is supported on seven bearings of a special aluminium alloy. It contains an oil channel bored through its center. The oil enters the camshaft through the rear bearing, and is distributed to each rockerarm by an orifice in the cam. Previous to each contact of the cam with the rockerarm a film of oil is trown off by the orifice in the cam, and wear is reduced to a minimum. The whole valve and camshaft assembly is mounted on the same base support, and is easily detachable. The camshaft is driven by bevel gears of the gleason type with ball thrust bearings with provision for taking up wear.



Camshaft and valve operating gear on « Excelsior » sports type engine.

The pistons are of aluminium alloy of a coefficient of temperature expansion, which closely approaches the coefficient of the cylinder material. The motor works over the widest range of speed without smoking or passing oil.



Vertical section view of camshaft and valve operating gear on « Excelsior » sports type engine.

The connecting rods are tubular and of ample strength, yet the weight is at a minimum. The combined light weight of the pistons and the connecting rods gives the engine a pik-up and flexibility which is unsurpassed.

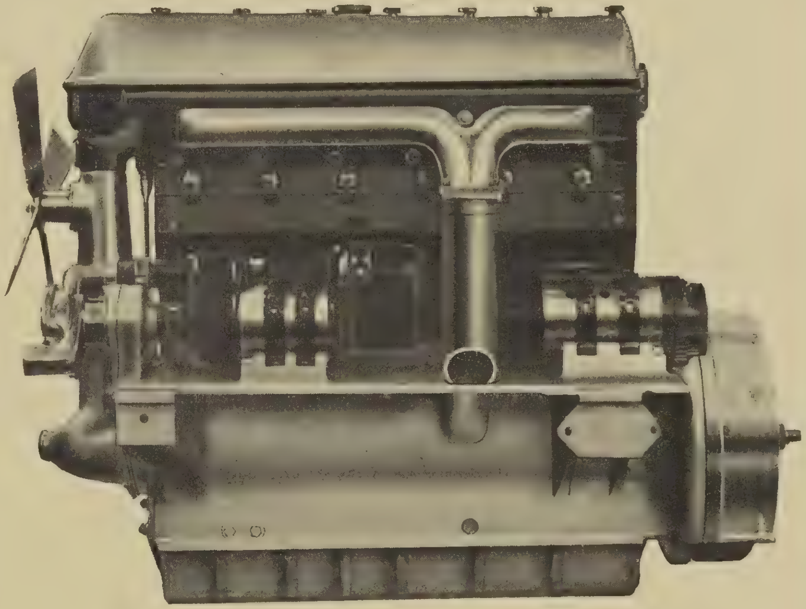
The crankshaft is supported on seven bearings in the upper half of the crank case. Dynamically and statically it is balanced to perfection. It has circular flanches carrying each throw and the whole crankshaft is machined out of one solid chrome-nickel steel forging.

The form of the crankshaft with its ample dimensions permits the motor to run at any speed without signs of any critical vibration.

The crank case is fastened tho the frame by four strong shoulders, so that frame and engine is brought together as one strong unit.

The crank case contains a partition in order to keep the oil-pump always supplied with oil, and at the same time prevent splashing.

The lubrication of the engine has been elaborated with painstaking care, and an ample supply of oil to all parts of the engine has been insured. The oil-pump is gear-driven and works entirely submerged in oil. It forces the filtered lubricant in rapid flow to all the seven bearings. The rear bearing communicates by a tube with the rear bearing of the camshaft. Oil is forced through this tubes and enters the camshaft. The camshaft feeds the oil forward and lubricates the whole valve mechanism. Return pipes of great cross-section are located in front and rear of the engine and permit quick return of the oil to the pump without exposing the oil to the heat in the upper part of the engine. An oil-radiator is also connected up to the pump and renders efficient cooling. The radiator is a feature which otherwise is only found on modern racing cars, but which has been embodied in the « Excelsior » engine to safeguard it under any imaginable endurance test. It is evident that a perfectly cooled oil will better retain its viscosity and lubricating properties and will consequently increase the life of the engine to a material extent.


« Excelsior » engine. — Sports type. — Exhaust side.

The cooling of the engine is effected by a water-pump insuring rapid circulation of water trough a honeycomb radiator. An air-fan is driven by friction disc from the vertical timing shaft.

The engine is equipped with three carburetters, which are all synchronized. Each carburetter feeds two cylinders through an intakemanifold of perfect symmetri. An exceptional homogeneity of the gas-air mixture is consequently insured to all cylinders, and a better filling of the cylinders is obtained at high speed.

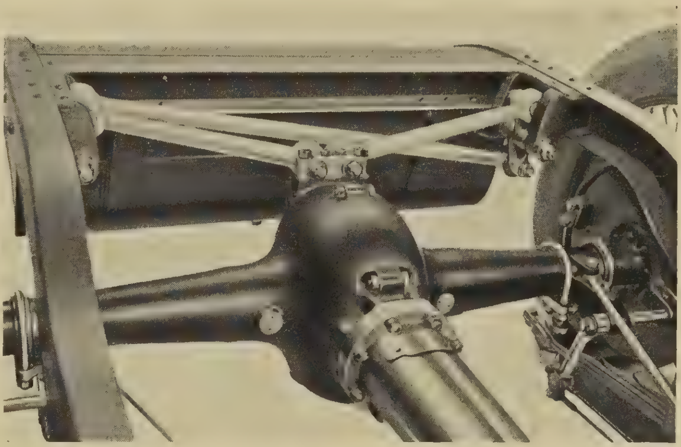
The intake manifold has been given a shape which offers the least friction and such proportions as will prevent eddy currents and the condensation of gasoline. Even in the coldest weather the engine will start immediately, and low-grade fuel is more economically consumed.

The exhaust piping has been equally carefully designed with a wiew of reducing the back pressure.

The magneto, the starting and the lighting equipment are of the best manufacture available.

THE SPRING SUSPENSION AND THE "ADEX" STABILIZER

SEMI-ELLIPTIC springs are used in front and cantilever springs in the rear, the latter being attached to the rear axle by ball and socket joints. The cantilever spring is the best type of spring suspension for the purpose of insuring comfortable and smooth riding of a car. However, there is an inherent defect in the cantilever spring which seriously restricts its general use. This is the tendency to cause rolling or see-sawing of the car, as it is driven at high speed over a rough road. This tendency to sometimes sway or roll at high speed is eliminated absolutely by the use of a special device designed and patented by M. A. De Coninck — the « Adex » stabilizer.



« Excelsior » rear axle. — Rear wheel brakes. — « Adex » stabilizer.

This is a new device which positively prevents the sidewise movement of the rear axle, and yet leaves the spring completely free for vertical movements. By this method the full benefit is derived from the easy riding qualities of the cantilever spring and all adnormal stresses on the springs are elimited. The drive takes place entirely through the drive tube.

The unusual speed with which the « Excelsior » car is able to take sharp turns at high speed, is also a tribute to the « Adex » stabilizer. The stabilizer divides the weight of the car more evenly on both rear wheels in a curve, and the resistance to skidding is not merely confined to the outer rear wheel. Both rear wheels resist the centrifugal force with almost equal strength and give the car that remarkable feeling of safety and comfort.

The « Adex » stabilizer is a device of extreme simplicity, yet ingenious. No adjustments are necessary and the entire upkeep is only confined to the refeling of oil to the containers.

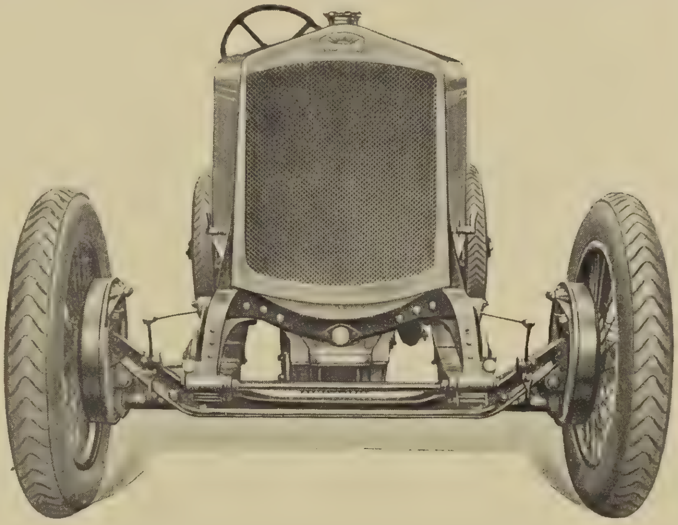
THE "ADEX" FOUR WHEEL BRAKES

THE remarkable use of the stabilizer has made possible the application of four wheel brakes with a much higher degree of safety. The danger, which so often has been emphasized, in combining strong four-wheel brakes with soft cantilever rear springs has been fully prevented in the « Excelsior » car. Its perfect riding qualities and its exceptional ability to hold the road permit the use of the four-weel brakes with the utmost force without loosing control of the car.

The « Excelsior » brakes have been developed with a view of bringing the car to a stop at the shortest possible distance.

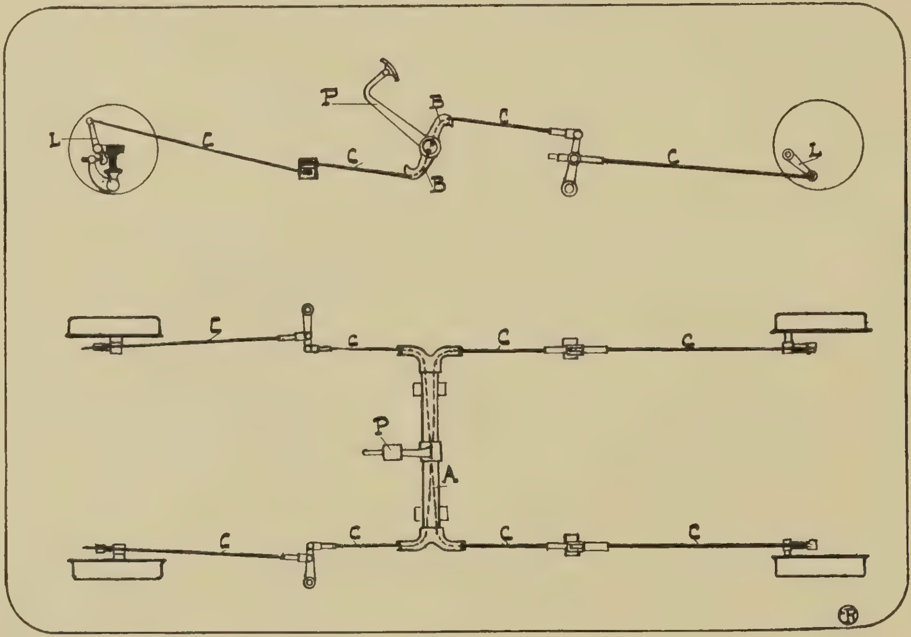
The « Adex » system embodies three distinct patented features :

1) Diagonal control of the brakes by cables ; the left front wheel is connected up to the right rear wheel and the right front wheel in connected up to the left



« Excelsior » Chassis, « Adex » licence. Type C. 6 cylinders, 35 H. P.
Front view with front wheel brakes

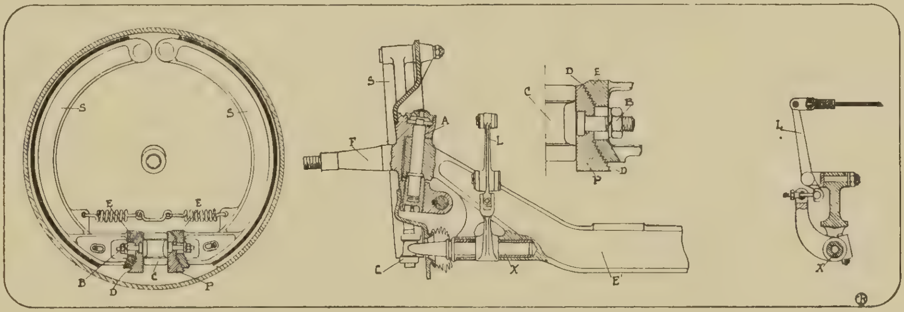
rear wheel. The system thus embodies two diagonal cables each of which is independently adjustable by a turnbuckle. The cables run lengthwise over pulleys and pass crosswise through a tube in the transversal axis on which the transmission



Four wheel « Adex » brakes. — Diagonal control.

and drivetube hinges. It is evident from this arrangement that the brake pressure on the left front wheel is precisely the same as on the right rear wheel and vice-versa. It is also evident that the movement of the rear axle is entirely without influenze on the tension in the cables. The advantage of the diagonal system is also that it offers double safety. For instance, if the left front wheel should not brake on account of one cable being out of commission, the right rear wheel must necessarily also be disconnected and the effect is neutralized. No skidding will happen. The other pair of wheels will however brake with the usual force and with perfect equalization. It is also evident for this same reason that the two cables do not have to be adjusted with exactly equal tension.

2) The cam and its shaft (C and X in the fig. below) form one solid part without any loose joints such as telescopic or universal connections. This means greater simplicity and less unsprung weight.

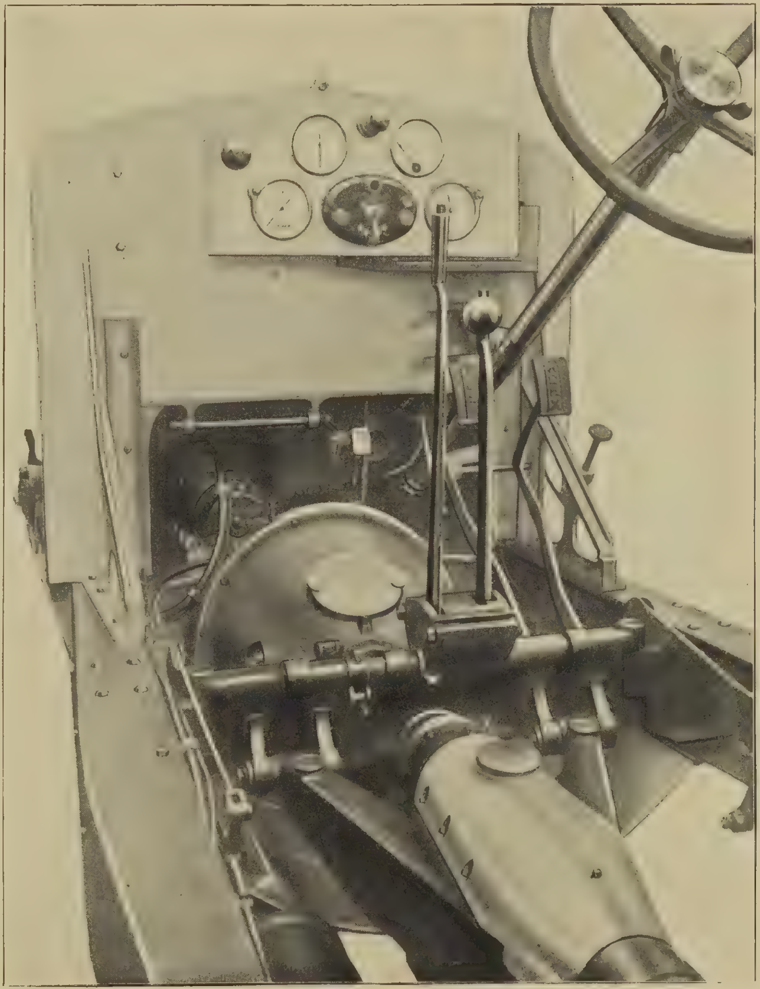


« Excelsior » front axle. — Section through the « Adex » brakes.

The cam is cylindrical with its axis coinciding with the centerline of the kingpin on which the wheel is pivoted. By this arrangement the application of the brakes does not affect the steering of the car. The cam with its shaft is built in the front axle as an integral part of it. Consequently the whole brake assembly follows the movement of the wheels independently of the spring suspension.

3) The brake shoes are furnished with adjustable heels. The heels are made of a hard die steel which will retain a smooth surface in contact with the cam even after the most severe usage.

The heels have adjustments on the side where they join the brake shoe. This adjustment permits exact resetting and compensates for the wear on the brake shoe lining. (On the fig. above the heels are designated by P)



"Excelsior"
Chassis
"Adex" licence
Type C.
6 cylinders
35 H. P.
Dash board
Clutch
Movable cross
member carrying
control levers.

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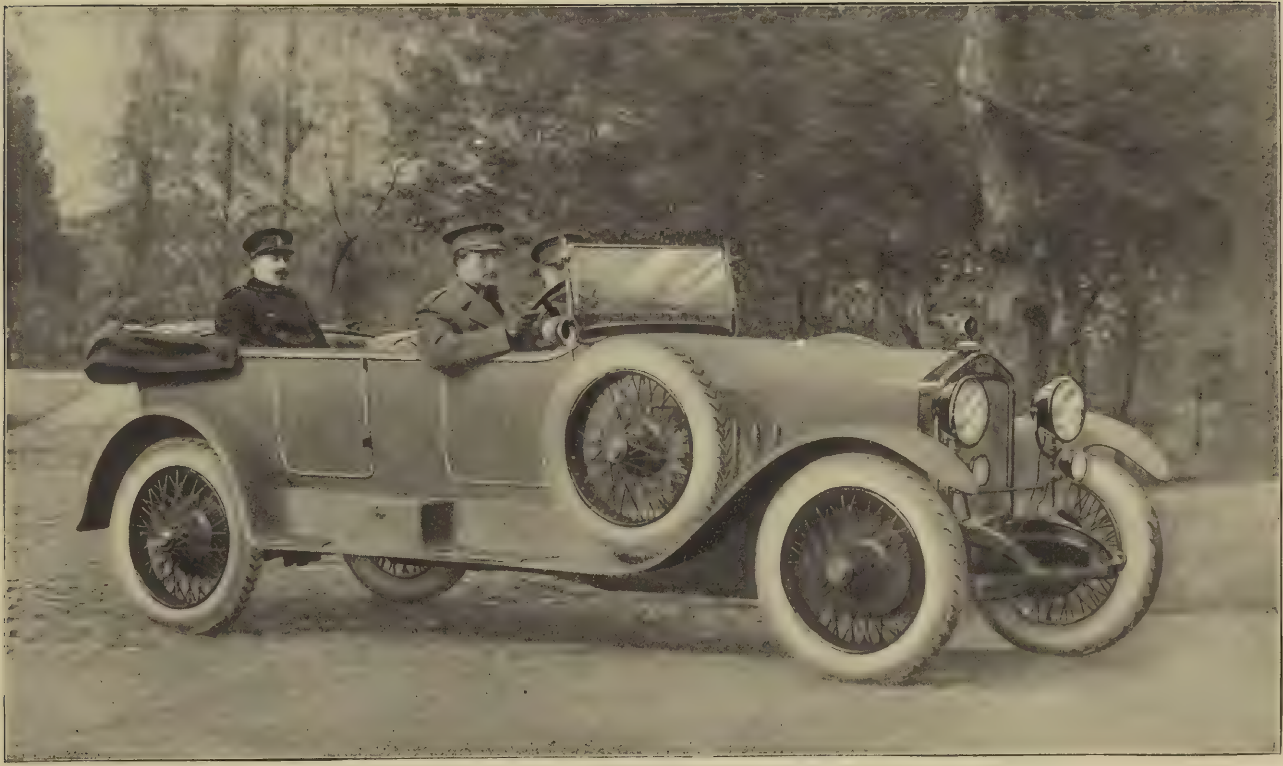
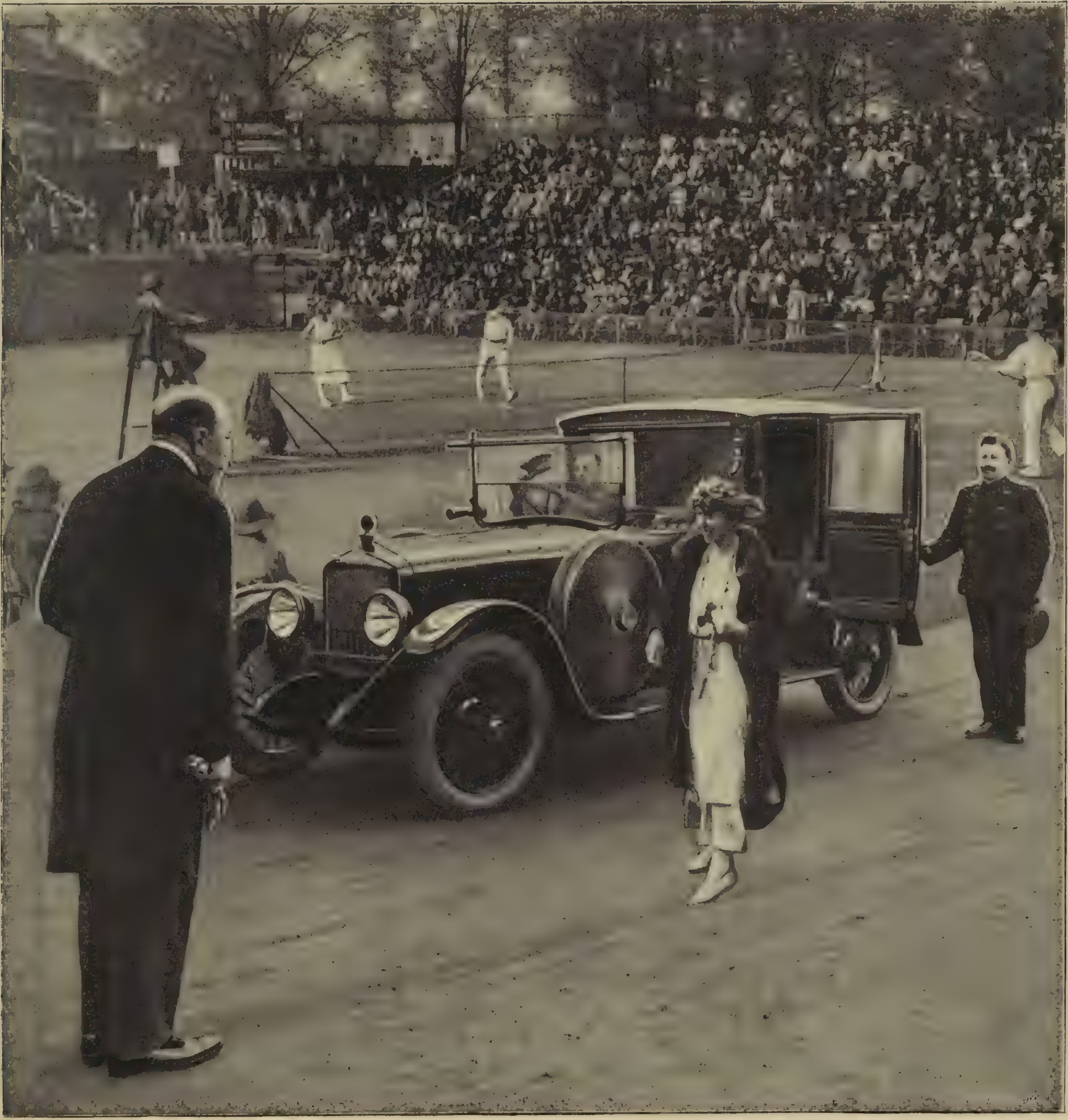
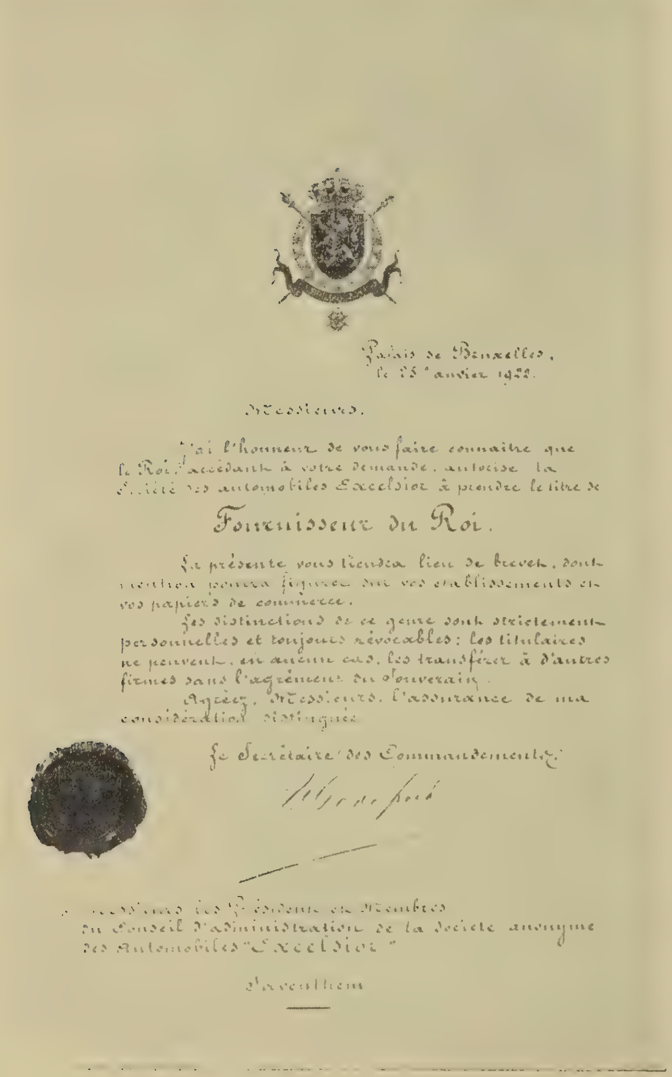


King Albert
driving his "Excelsior Adex" car.



Queen Elizabeth
and her charming
"Excelsior Adex"
coupe
at the
Leopold Club



Palais de Bruxelles,
le 25 Janvier 1922.

Messieurs,

J'ai l'honneur de vous faire connaître que le Roi, accédant à votre demande, autorise la Société des automobiles Excelsior à prendre le titre de

Fournisseur du Roi.

La présente vous tiendra lieu de brevet, dont mention pourra figurer sur vos établissements et vos papiers de commerce.

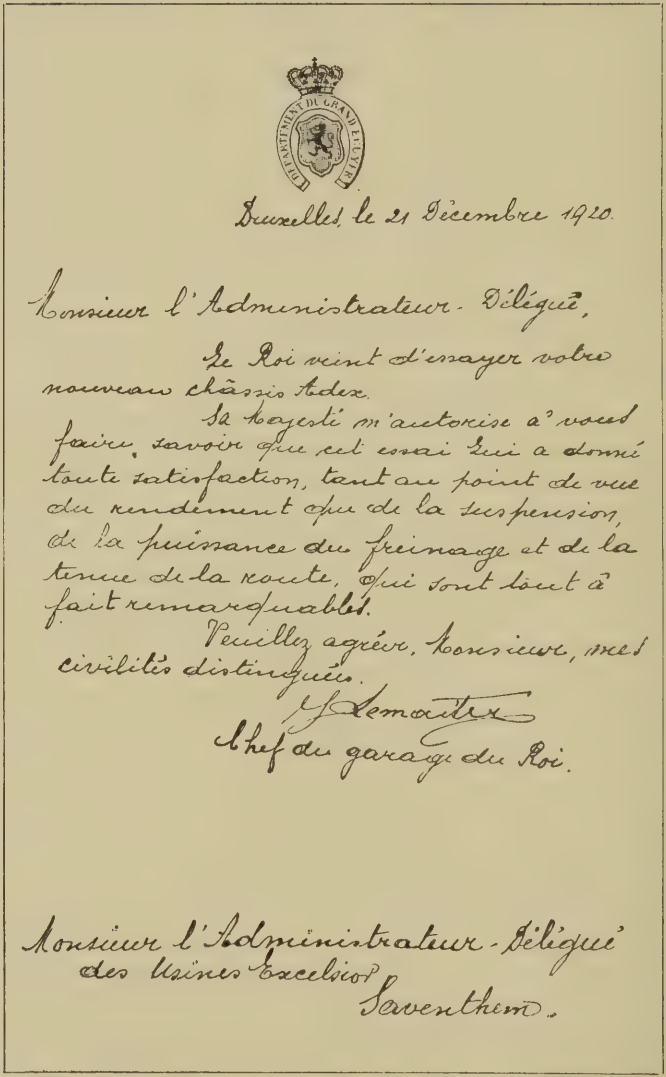
Les distinctions de ce genre sont strictement personnelles et toujours révocables: les titulaires ne peuvent, en aucun cas, les transférer à d'autres firmes sans l'agrément du Souverain.

Agréez, Messieurs, l'assurance de ma considération distinguée.

Le Secrétaire des Commandements,

À Messieurs les Président et Membres
du Conseil d'administration de la Société anonyme
des Automobiles "Excelsior"

Saventhem



DÉPARTEMENT DU GRAND ÉCUYER

Bruxelles, le 21 Décembre 1920.

Monsieur l'Administrateur-Délégué,

Le Roi vient d'essayer votre nouveau châssis Adex.

Sa Majesté m'autorise à vous faire savoir que cet essai lui a donné toute satisfaction, tant au point de vue du rendement que de la suspension, de la puissance du freinage et de la tenue de la route, qui sont tout à fait remarquables.

Veuillez agréer, Monsieur, mes civilités distinguées.

G. Lemaître
Chef du garage du Roi.

Monsieur l'Administrateur-Délégué
des Usines Excelsior
Saventhem.

THE TRANSMISSION AND CLUTCH

THE transmission is not built as a unit part of the engine assembly. In a unique manner the transmission is built as an integral part of the drive tube. The design embodies all the advantages of the single-unit power plant without any of its disadvantages.

In the « Excelsior » car only one universal joint is necessary, i. e. the joint between the clutch and the transmission. This joint, being located at the greatest possible distance from the rear axle, is to a much less degree exposed to wear and tear and lasts much longer than an universal joint on the drive shaft.

The transmission box is provided with two arms like a fork, on which it is hinged to the crossmember of the chassis, and trough which the drive is transmitted.

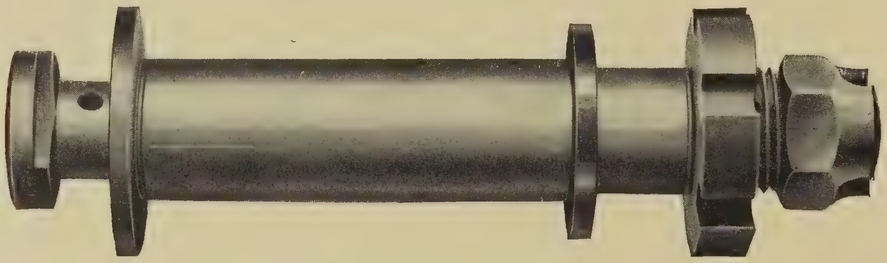
The transmission has three forward speeds and one reverse. The cluch is of the dry multiple disc type. It is made up of seven pairs of metal discs, each of which is covered on both sides with a ring of raybestos. The thirteen friction surfaces insure soft and progressive engagement and make the shifting of gears easy.

The pressure on the clutch discs is obtained by three springs which are readily adjustable.

The thrust of the clutch is without any effect on the crankshaft as it is absorbed by a ball bearing located in the rear socket of the clutch support. The action of the foot pedal is adjusted by taking up on two nuts on the relay rod between clutch and pedal.

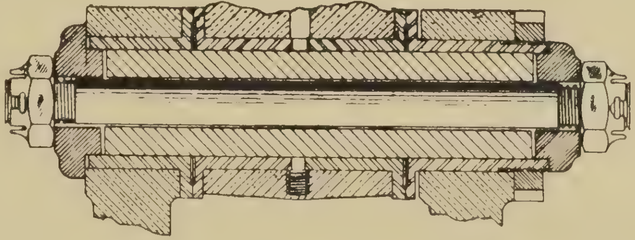
THE "ADEX" ADJUSTABLE AND SELF LUBRICATING SHACKLE AND SPRING BOLTS

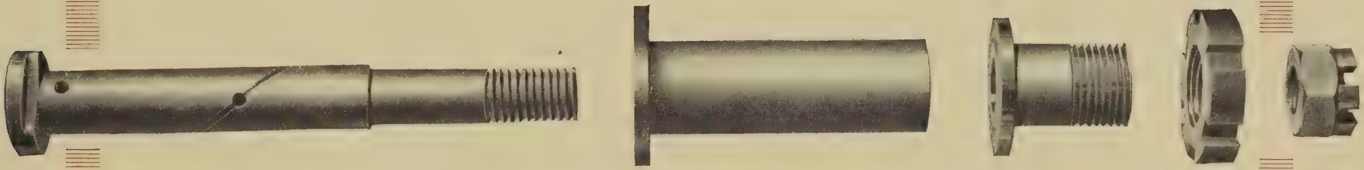
IT is well known that oil is a far superior lubricant to grease. Oil penetrates everywhere and forms a continuous film over the whole surface. Grease on the other hand dries up and hardens and is not readily replaced by fresh lubricant. Whenever grease is used to lubricate the spring bolts the results will always be unsatisfactory, even if the chauffeur would turn up the grease cups every day. A rapid wear is the outcome and the car will become noisy and rattle.



« Adex » Shackle bolt completely mounted.

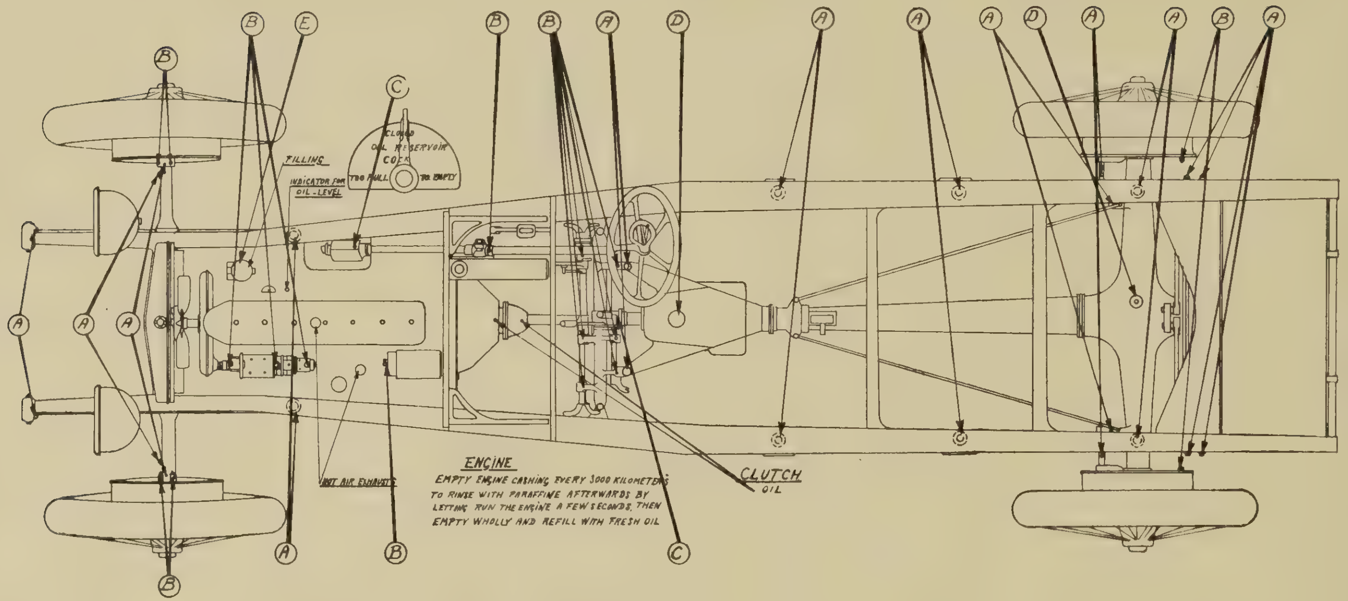
In the « Excelsior » chassis each shackle and spring bolt is automatically lubricated from an oil well or oil reservoir placed above each bolt. The bolts have been specially designed for this purpose and are provided with oil channels and grooves. Oil will penetrate everywhere and at the same time exclude dust and moisture. The whole shackle mechanism is composed of a number of chrome-nickel steel parts, each of which is carefully machined so as to give a perfect fit. The bolts are furthermore made with a provision to take up sidewise play in such a way that no looseness or rattles will develop. No matter how far an « Excelsior » car has been driven it can always be restored to that silent state which signifies the operation of a new car, and which adds so much comfort to motoring.





The essential parts of the « Adex » shackle with improved lubricating system and provision for taking up lateral play.

OILING SCHEME FOR THE ADEX C SPORT CHASSIS.



ENGINE
EMPTY ENGINE CASHING EVERY 3000 KILOMETERS TO RINSE WITH PARAFFINE AFTERWARDS BY LETTING RUN THE ENGINE A FEW SECONDS, THEN EMPTY WHOLLY AND REFILL WITH FRESH OIL

STRUCTURE		DESIGNATION OF THE OIL OR FAT TO BE USED
Front-hands of front suspension springs	A	**In Summer time** **ENGINE OIL to be mixed 3/4 with 1/4 VALVOLINE** **In Winter time** **ENGINE OIL** The oiling structures should be cleaned with paraffine viz 2 of 3 times a year
Rear Supports of front suspension springs		
Front-axle cams		
Front-axle pivots		
Gear-box hands		
Front-supports of rear suspension springs		
Central-supports » » »		
Rear-knuckles »		
Stabilisator-supports		
Brake-cams of rear axle and ends of cams		
Brake-rings pivots of front-axle	B	Every fort night 3 or 4 drops
Dynamo-magneto		Every fort night 2 or 3 drops
Self starter		Every fort night 2 or 3 drops
Steering tube		Every two or three days
All sockets of the movement-traverse		Every week
Brake-rings pivots of rear axle		Every fort night 3 or 4 drops

STRUCTURE		DESIGNATION OF THE OIL OR FAT TO BE USED
Steering-box	C	**CONSISTENT FAT** Consistent fat mixed with plumbago Every month Melt consistent fat for filling
Knuckle-joint		
Gear box.	D	**VALVOLINE** Never exceed the height of the shifting arbor From time to time inspect this level To add 1/2 liter of Valvoline every six months Never exceed the "Too full stopper"
Rear axle		
Engine case filling	E	**ENGINE OIL** The filling of the engine case should never be done trough the hot air exhausts Fill by the stopper, marked "Remplissage" which is in front of the steering. Never allow the floater. Rod marks at 8, when this will occur, add 5 to 6 liters oil

THE UPKEEP AND THE ADJUSTMENTS OF THE "EXCELSIOR" TYPE C. 35

The Carburetters

The carburetters are normally adjusted for gasoline of 0,725-0,740 sp. g. (as delivered from factory).

Great economy in gasoline consumption can also be obtained by the intelligent use of the controller.

Lubrication

Only the highest grade of a lubricating oil should be used in the motor. Mobil oil A is recommanded for use in winter and Mobiloil BB in summer. The oil gauge should indicate a pressure of at least 2 Kgrm. when the motor turns over 1000 RPM. and the motor is well heated up. The oil reservoir holds approximately 3 1 2 gallons when full. It should not be allowed to contain less than 2 gallons or 8 liters as indicated by fhe floater.

When a new car is put into commision it is best to drain out the oil after the first 1000 Km. (700 miles). After that the oil should be drained off every 3.000-3.500 miles. Always use the regular oil-hole marked « Remplissage » for putting oil in the motor. Never fill oil through the breath holes.

Transmission

Use VALVOLINE for lubricating the transmission (liquid red vaseline). Add about one pint of VALVOLINE every six months but do not fail to inspect the transmission periodically. The lever should not go above the center of the main transmission shaft.

Rear Axle

Use VALVOLINE and fill up to the overflow plug. Add one quart of VALVOLINE every 6000-7000 miles.

Water Pump

Fill up the grease-cup with a mixture of grease and graphite flakes and turn up the cup frequently.

Magneto, Starter, Dynamo and Battery

Special litterature is furnished on these subjects.

Spring-shackles

All the shackles and spring bolts are lubricated by oil. In winter it is advisable to use a medium grade oil, while in summer a heaver grade will give more satisfaction. Oil wells and oil containers have been provided at various points in order to furnish a positive automatic lubrication of all the flexible joints. Oil wells are located in the front end of the frame to lubricate the front springs. They should be filled up every three months. Oil containers are located inside the chassis frame at the points where the cantilever springs and the shackles are attached to the frame. They are readily accessible from underneath the car and are of sufficient capacity to hold oil for three months.

These containers communicate with the shackle and spring bolts by means of tubes. Wicks drain the oil from the containers into the tube.

Care should be taken that the wicks penetrate far enough down the tube to act as a syphon. It is recommended when overhauling a chassis to wash out all the oil wells and containers with gasoline.

Support of Transmission Box to Crossmember carrying Speedlevers

Fill up the oil wells every three months.

Pivots of the Stabilizer

Two hexagon nuts are located at the point where the stabilizer on each side is attached to the frame. Unscrew these nuts and fill oil every three months through the orifice inside. The orifice leads to an oil reservoir inside the hollow brackets which holds the stabilizer to the frame.

Alemite Lubrication

All parts provided with the Alemite system should be oiled every month by means of the Alemite gun.

Wheel Caps

Keep the threaded locking cap inside the wheel hub in a clean condition and add a few drops of oil periodically.

Removal and Mounting of « Adex » Wheels

Take off the hubcover by hand by a quarter turn. Then apply the special wheel wrench to the Locking cap in such a way that the wrench pin pointing to the side fits into the whole in the cap. The wrench pin disengages the locker in the cap and the wheel cap can be unscrewed without difficulty. The wheel can then be removed by lifting it from its seat.

To mount the wheel again it is necessary to place the wheel back to its seat again and screw on the wheel cap. The wrench is used this time with *the pin pointing out*, and *not* inserted in the hole. Make sure that the wheel is on tight. Never attempt to unscrew a wheel cap without the special wrench.

The « Adex » Brakes

In order to get the best service from the brakes it is advisable to comply with the following directions :

See that the brake drums are always dry.

Avoid that one shoe brakes stronger than the other, and see that both shoes are set exactly alike in relation to the clearance of the drums. The detachable heel P serves the purpose of adjusting this clearance.

The cam C actuating the brackeshoes should always work with the smallest possible angle of movement.

The adjustment of the cables is of course also of importance, and is done in the following manner :

1) Jack up the front axle;

2) Apply the brakes on the wheels;

3) Move the wheels with the hand in the forward direction and find out which wheel binds the least;

4) Take up on the cable on the side where the wheel binds the least. To do this unscrew the lockscrew and then give the treaded buckle in which the cable terminates a turn to the right. Then give each wheel alternately a turn with the hand and make adjustements on the cable untill both wheels bind equally strong;

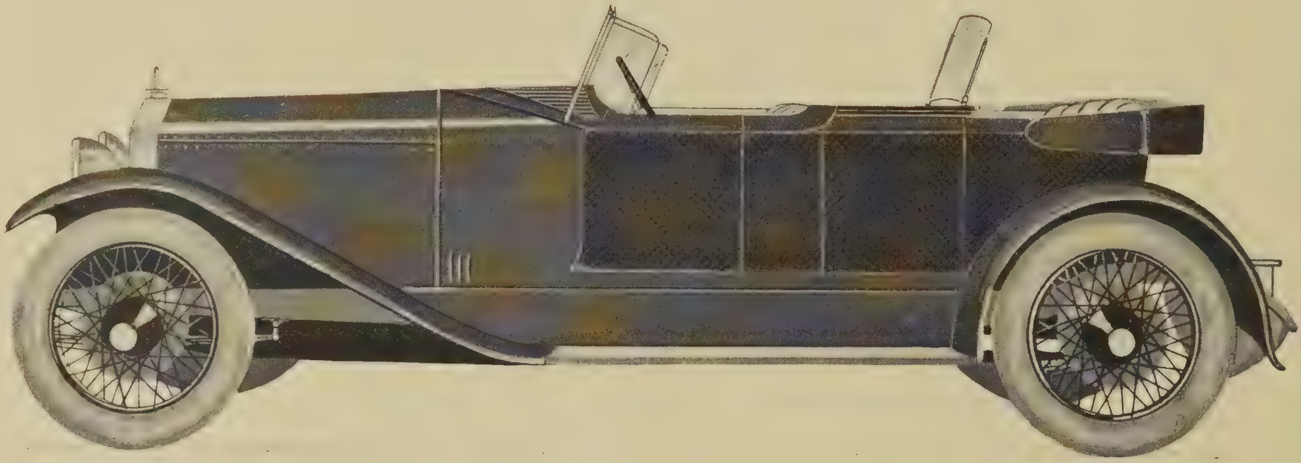
5) When the front wheels are regulated in this way the rear wheels will also be equalized as they are controlled by the same cables.

To test the brakes drive the car at a speed of twenty five miles per houp on a flat road. Then let the steering wheel go and apply the brakes strongly. If the car should have a tendency to go to the left. take up slightly on the cable attached to the right front wheel and vice-versa.

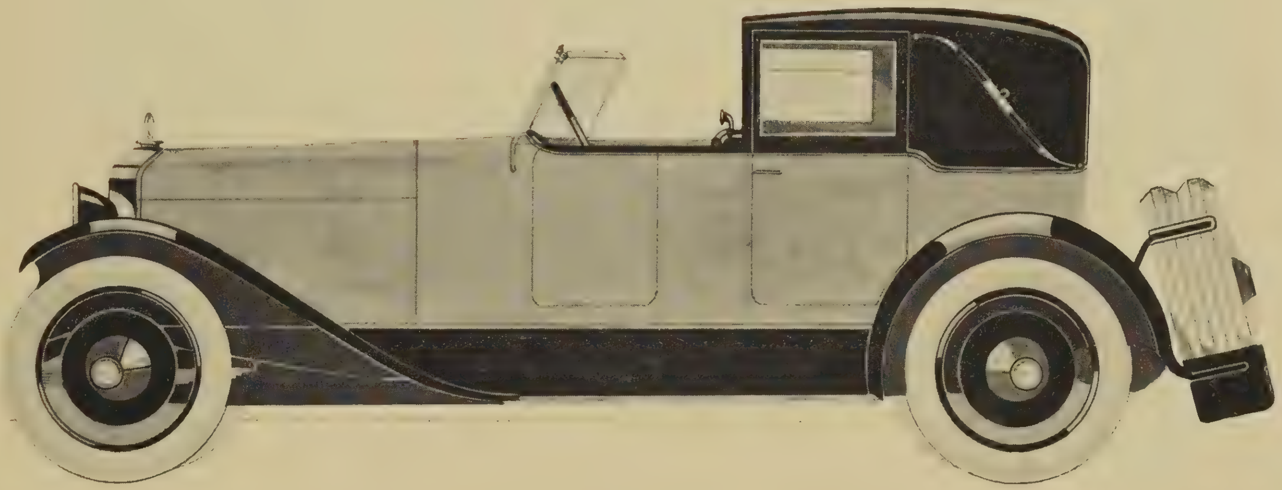
Adjustment on the Brake Shoes

On the figure showing the crossection of the brakes, P designates the heel on the brake shoe. The heel is provided with steps D on the one side. Each step is one millimeter deep, and the heels are attached to the shoes with bolts and nuts B in such a way that the steps fit exactly to corresponding steps on the shoe. By loosening the nut B, the heel can by any number of steps and the position of the brakeshoe in relation to the cam accordingly fixed. Should the shaft with the brake cam have to be turned over a considerable angle in order to put the brake shoe in action, it is advisable to adjust the position of the heels rather than rely upon the adjustment of the cables.

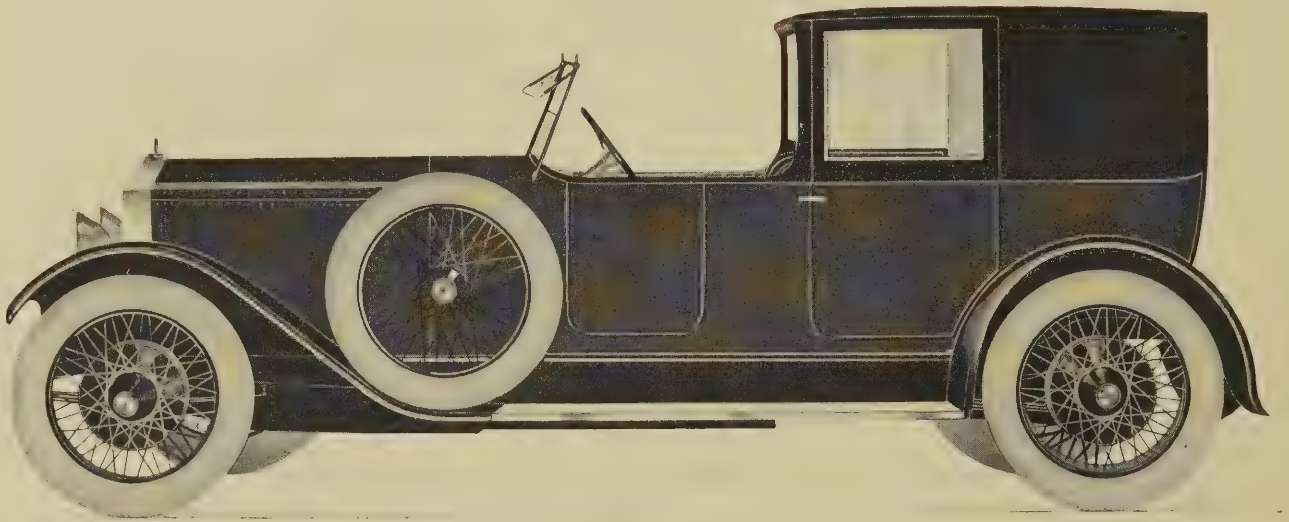
Whe resetting the heels, slacken the cables and proceed setting the higher up towards the center of the drum untill the cam in its vertical position gives the proper clearance between brakelining and drum. The amount of clearance must of course be carefully considered, as otherwise the brakes may drag. When the heels are adjusted, the cables are taken up and adjusted in the usual way.



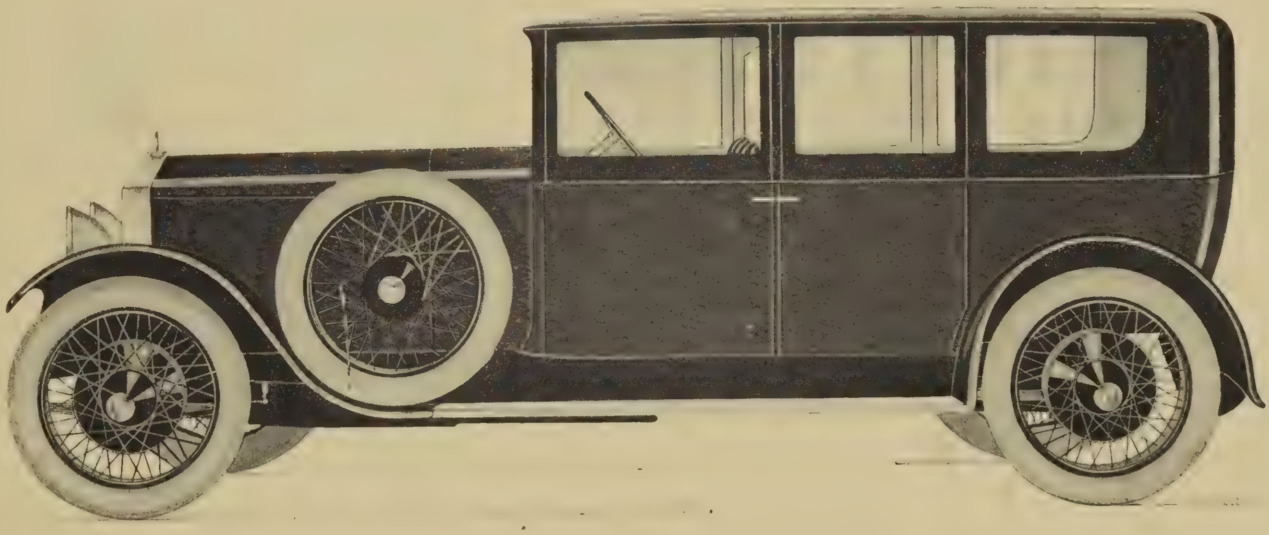
Open Sporting Car
on "Excelsior" Chassis, "Adex" licence
Type C. 6 cylinders, 35 H. P.



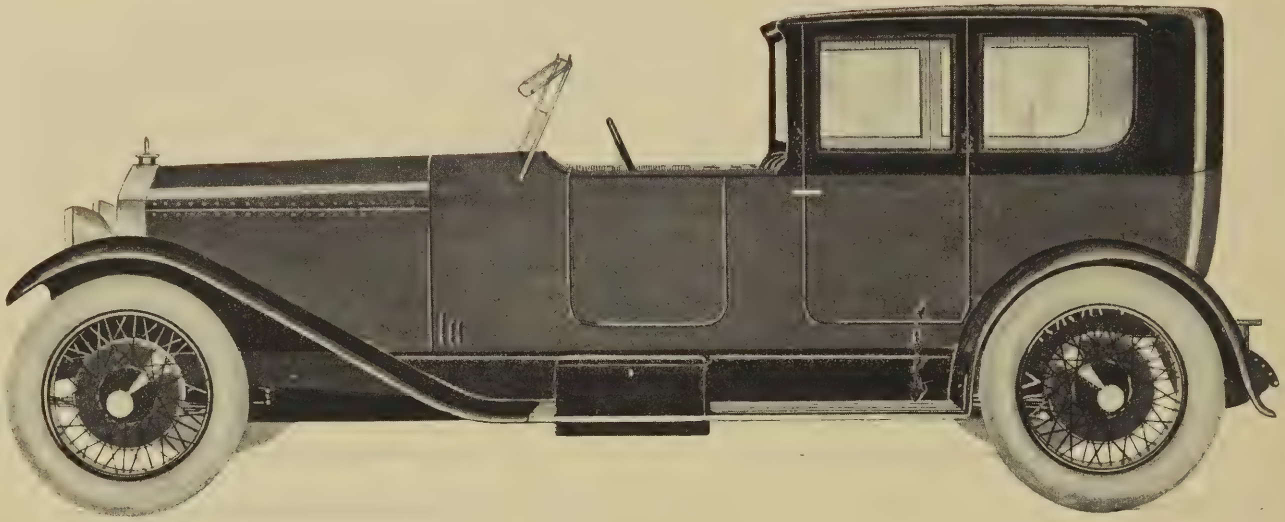
Cabriolet
on "Excelsior" Chassis, "Adex" licence
Type C. 6 cylinders, 35 H. P.



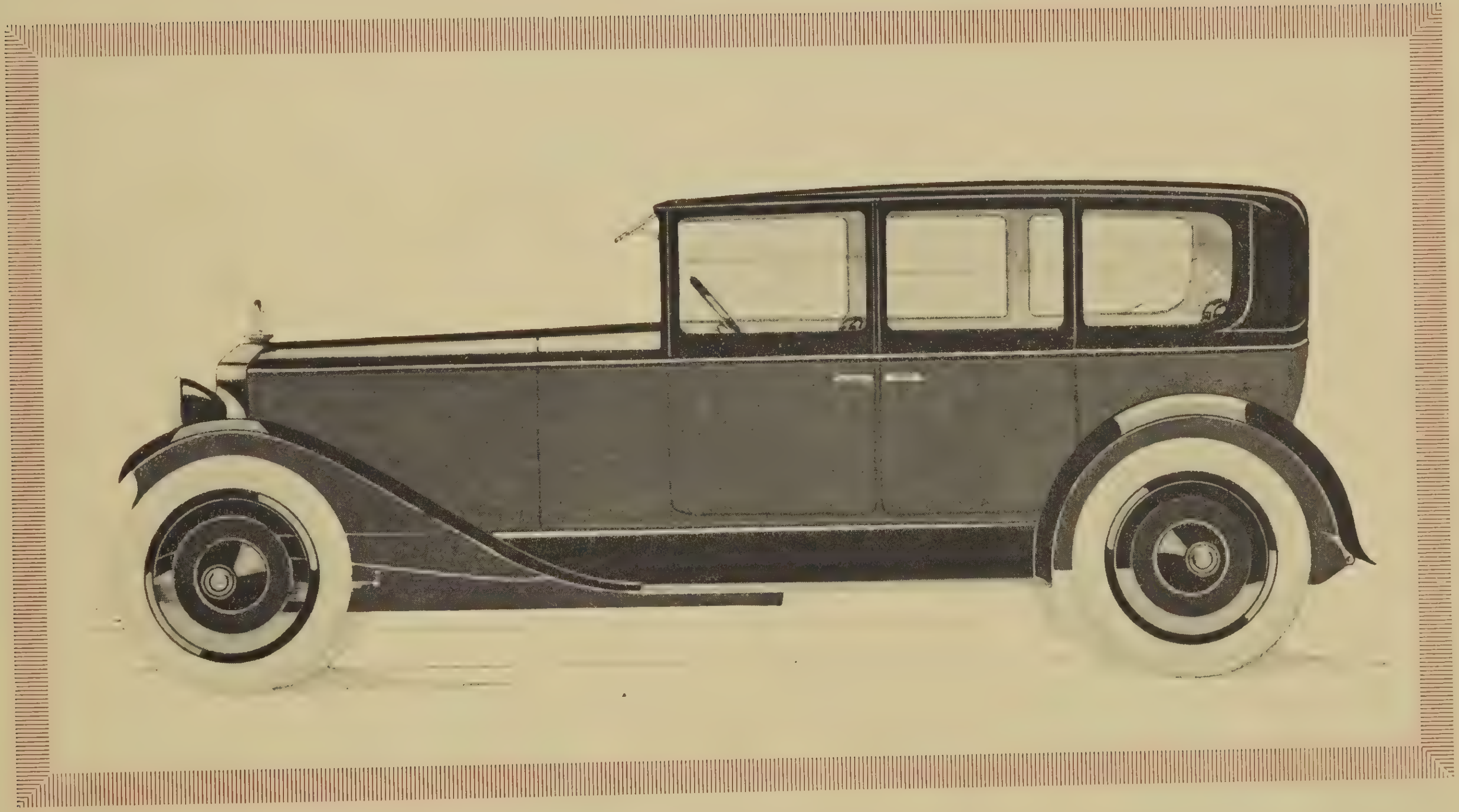
Town Coupe
"Excelsior" Chassis, "Adex" licence
Type C. 6 cylinders, 35 H. P.



Inside drive Car, Weyman patent,
on "Excelsior" Chassis, "Adex" licence
Type C. 6 cylinders, 35 H. P.



Coupe-Limousine
"Excelsior" Chassis, "Adex" licence
Type C. 6 cylinders, 35 H. P.



Inside drive car (Sedan)
"Excelsior" Chassis, "Adex" licence
Type C. 6 cylinders, 35 H. P.

EXCELSIOR CHASSIS TYPE C 35 SPORT

Specifications in brief :
Motor : Bore 90 mm. Stroke 140 mm. (Aproximately 3 5/8" × 5 1/2").
Clutch : Multiple dry-disc.
Transmission : Three speeds forward and reverse.
Gasoline tank : Capacity about 25 gallons.
Vacuum gasoline feed.
Right hand drive.
Control levers for transmission and brake in center.

Width of chassis in front	650 mm.	26"
» » rear	1000 mm.	40"
Total length of chassis	4830 mm.	193"
Total width » «	1720 mm.	68 3/4"
Track in front and rear	1450 mm.	58"
Wheelbase	3565 mm.	142 1/2"
Body space	2800 mm.	111 1/2"

Weight of chassis about 1500 kg., 3300 lbs.
Size of tires 33 × 5.

Instrument board. — The instrument board is equipped with speedometer, oil pressure gauge, eight-day clock, nivex gasoline indicater, mixture controller and electric switch and fuse box.

A complete set of tools and a set of electrical replacement parts is delivered with every chassis.

Société Anonyme
des
Automobiles "Excelsior"
Saventhem (Belgique)

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